MWI 8715.3
REVISION D
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MARSHALL WORK INSTRUCTION

QD01

HAZARD IDENTIFICATION AND WARNING SYSTEM

DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		12/13/99	
Revision	A	5/15/01	Renumbered document in accordance with MPG 1410.2; changed Purpose to read "This document establishes the requirements for a uniform visual system and an effective means of communicating information to the employee so that injury related to potential hazards in the work environment at MSFC can be avoided"; added MWI 8715.2 and ANSI Z535.1-1991 to section 3; added 4.2 through 4.4; added 5.1, 5.2, 5.2.1, 5.3.1, 5.4, 5.4.1 & 5.4.2, 5–5.5.2, 5.6, 5.7, 5.8, 5.9, 5.10.1, 5.11-5.17, 5.19, 5.20, 5.22, 5.23, 5.25, and 5.26; revised 5.1 to read "…or path to identify and restrict…"; revised 5.3 to read "Biological Hazard Signs/Tags. These signs and tags shall…containers, material, and rooms…with viable hazardous…"; revised 5.4 to read "Caution Signs/Tags. These signs and tags are used to indicate potentially minor hazardous situations that, if not avoided, may result in minor or moderate injury. These signs or tags may also be used to call…practices. Caution tags shall…injury. Caution tags are used for property damage only mishaps"; revised 5.5 to read "Danger Signs/Tags. These signs or tags shall be used to indicate imminently major hazard situations that, if not avoided, will result in death…Danger tags should not be considered for property damage mishaps unless personal injury risk appropriate to this level is also involved"; revised 5.10 to read "Notice Signs/Tags. These signs and tags are used to indicate a statement or company policy or indirectly relate…These signs or tags are not…"; deleted paragraph "5.f"; revised 5.12 to read "…These signs are a visual alerting device that advises the observer of the nature and degree of the potential hazard(s) that can cause injury or death. It can also provide safety precautions, general instructions relative to safety work practices, reminders or proper safety procedures, evasive actions to take, or provide other directions to eliminate or reduce the hazard"; revised 5.15 to read "Warning Signs/Tags. These signs and tags shall be used to indicate a potentially hazardous situation that, if not avoided, could result in death or serious injury. Warning tags should not be considered for property damage accidents unless personal injury risk appropriate to this level is also involved"; deleted "5.i"; revised paragraph 6 NOTE to read "SIGNS, TAGS, AND BARRICADES"; revised 6.1 to read "…supervisors, or building managers shall…danger signs and tags as a means of…an area that is restricted or considered hazardous or unsafe…'Specifications for Accident Prevention Signs and Tags,' 29 CFR 1926.200, 'Accident Prevention Signs and Tags,' 29 CFR 1926.202, 'Barricades,' and ANSI Z535.1, 'Safety Color Code'"; added 6.2; revised 6.3 to read "When an employee recognizes a…shall notify the area supervisor and/or building manager of the hazard or unsafe condition"; revised 6.4 to read "The area supervisor and/or building manager shall evaluate the hazard or unsafe condition, secure the area if required and inform any affected employees of the hazard or unsafe…"; added 6.5; revised 6.6 to read "The area supervisor and/or building manager shall indicate any actions necessary to correct the hazardous or unsafe…"; added 6.7; deleted section 6.e; added 6.8 through 6.9.5; revised 6.9.9 to read "…Department (EED) and/or the Occupational Medicine and Environmental Health Services (OMEHS) representative"; revised 6.10.1 to read "…placed by any organization to identify and/or deny access to hazardous areas…unsafe areas and comply with section 5 (definitions) and the following:";

			changed 6.10.3 to read "Physical barricades used shall be constructed of a physical means such as a wooden structure, orange polyethylene fencing with the grid or diamond mesh design or similar"; added 6.10.4 through 6.10.6; added "PSD" to 6.10.7; added records under section 9; and added "This training may be accomplished by reviewing this MWI during a group safety meeting. This training will be required every 2 years" to section 10.
Revision	B	5/6/2004	Major rewrite
Revision	C	9/10/2004	Major rewrite in accordance with HQ rules review, added sections 5.15, 6.10 & 6.13.
Revision	D	4/11/2006	No requirement changed to this MWI. Changed paragraphs to have only one "shall" statement. Changed paragraph numbers. Added Appendix B, C, and D to show the use of symbol/pictographs with signs. Reworded section 6.6 and changed to 6.3 and 6.4 to better define the hazard identification process and to better clarify the roles of employees, supervisor, and building manager. Reworded definitions of Danger, Caution, Warning, Safety Alert Symbol, Major Message, and Message to be clearer in their meaning. Added definition for Magazine for explosive storage. Added signage requirements for explosives. Added more details for laser signage. Added sign and tags can be constructed/computer generated at MSFC. Added roadway and parking lot signs. Reworded some requirements for barricades. Added reference to MWI 6700.1 and MWI 8715.15. Added 6.25 Test Area Warning Signs and Lights. Changed title of document to Hazard Identification and Warning System.

1. PURPOSE

This Marshall Work Instruction (MWI) establishes the requirements for a uniform visual system for identifying/marking potential hazards, and provides an effective means of communicating hazard information to the employees in order to reduce the likelihood of injury from potential hazards in the Marshall Space Flight Center (MSFC) work environment.

This MWI defines the types of signs, tags, and barricades to be used in controlling exposure to potential hazards, and provides the specifications for the design, application, and use to ensure uniformity and to promote employee recognition and avoidance of hazards.

2. APPLICABILITY

This MWI applies to all MSFC controlled facilities and operations.

3. APPLICABLE DOCUMENTS

3.1 23 CFR 655, "Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices (MUTCD)"

3.2 29 CFR 1910.145, "Specifications for Accident Prevention Signs and Tags"

3.3 29 CFR 1910.1200, "Hazard Communication"

3.4 49 CFR 172, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communication, Emergency Response Information, and Training Requirements"

3.5 Alabama Department of Transportation Regulations

3.6 ANSI Z136.1, "American National Standard For the Safe Use of Lasers"

3.7 ANSI Z535.1, "Safety Color Code"

3.8 ASME A13.1, "Scheme for the Identification of Piping Systems"

3.9 MPR 1840.2, "MSFC Hazard Communication Program."

3.10 MPD 1860.1, "Laser Safety"

3.11 MPD 1860.2, "Radiation Safety Program"

3.12 MWI 6700.1, "MSFC Motor Pool Operations"

3.13 MWI 8715.2, "Lockout/Tagout Program"

3.14 MWI 8715.4, "Personal Protective Equipment (PPE)"

3.15 MWI 8715.15, "Ground Operations Safety Assessment & Risk Mitigation Program"

3.16 National Fire Protection Association (NFPA) 495, "Explosive Materials Code"

3.17 NPR 1441.1, "NASA Records Retention Schedule" (NRRS)

4. REFERENCES

4.1 29 CFR 1910.144, "Safety Color Code for Marking Physical Hazards"

4.2 29 CFR 1926.200, "Accident Prevention Signs and Tags"

4.3 29 CFR 1926.202, "Barricades"

4.4 ANSI Z535.2, "Environmental and Facility Safety Signs"

4.5 ANSI Z535.3, "Criteria for Safety Symbols"

4.6 ANSI Z535.5, "Accident Prevention Tags (For Temporary Hazards)"

4.7 MPR 1840.3, "MSFC Hazardous Chemicals in Laboratories Protection Program"

4.8 NPR 8715.3, "NASA Safety Manual"

5. DEFINITIONS

5.1 Barricade. A physical barrier placed across a path of travel to identify and restrict persons and/or vehicles from passing through and accessing hazardous areas or locations.

5.2 Barricade Tape. Tape, red or yellow in color, installed to communicate the need for caution or warn of danger. Tape may be imprinted with hazard specific symbols or text. Barricade tape is not categorized as a physical barrier.

5.3 Biological Hazard or Biohazard. Infectious agents presenting a risk of death, injury, or illness to employees.

5.4 Biological Hazard Signs/Tags. Signs and tags installed to identify the actual or potential presence of a biological hazard, and to identify equipment, containers, material, and rooms that contain or are contaminated with viable hazardous biological agents. Also referred to as "biohazard" signs/tags.

5.5 Caution Signs/Tags. Signs and tags installed to call attention to potential hazards and unsafe practices which, if not avoided, could result in minor to moderate injuries or property damage.

5.6 Danger Signs/Tags. Signs and tags installed to call attention to potential hazards that, if not avoided, can result in serious injuries or death. Use of "Danger" as the signal word is mandatory where the potential hazard exposes personnel to imminent danger and is to be limited to the most extreme situations.

5.7 Fire Safety Signs. Signs installed to indicate the location of emergency fire fighting equipment.

5.8 Label or Placard. A visual alerting device installed to communicate the nature of degree of a potential hazard. It can also describe safety precautions or evasive actions to take, or provide directions on reducing or eliminating the hazard. Can take the form of a decal, or markings created by embossing, stamping, etching, or other manufacturing process.

5.9 Hazardous Materials Information System (HMIS). A system that uses standard labels to communicate hazards through the use of colors, numbers, letters of the alphabet, and symbols. The HMIS provides identification of the chemical, acute health hazard, flammability, reactivity, personal protective equipment requirements, and chronic health hazard information.

5.10 Lockout/Tagout Tags. Tags installed to communicate a warning against actuation or re-energization of a powered system, machine, or equipment item, due to the potential for serious to fatal injury of personnel performing service or maintenance tasks on the equipment in question. Lockout/Tagout tags can also be referred to as "tagout devices." Reference MWI 8715.2, "Lockout/Tagout Program," for more information.

5.11 Major Message. The portion of a sign, tag, placard, or label indicating the specific hazardous condition to be communicated. Examples include: "High Voltage," "Close Clearance," "Do Not Start," or "Do Not Use," or a corresponding pictograph used with a written text or alone.

5.12 Magazine. Any building or structure, other than an explosives manufacturing building, used for the storage of explosives.

5.13 Message. The portion of the sign, tag, placard, or label identifying the hazard and probable consequences if not avoided. The panel can also contain actions or measures to take in order to avoid the hazard and can also include a hazard symbol/pictograph as well.

5.14 Mishap. Any unexpected occurrence, event, or sequence of events that result in injury or death to employees or visitors, or damage to NASA equipment or property.

5.15 Mishap Prevention Tag. All accident prevention tags are installed to identify hazardous conditions and provide a message to employees with respect to hazardous conditions, or to meet the specific tagging requirements of OSHA standards.

5.16 National Fire Protection Association (NFPA) 704 Label. A system that uses a color-coded diamond with four quadrants in which numbers are used in the upper three quadrants to signal the degree of emergency health hazard (blue), fire hazard (red), and reactivity hazard (yellow). The bottom quadrant is used to indicate water reactivity, radioactivity, biohazards, or other special hazards.

5.17 Notice Signs/Tags. Signs and tags are installed to communicate a statement of MSFC or company policy, or messages indirectly relating to the safety of personnel or protection of property.

5.18 Panel. The portion of a sign, tag, placard, or label having a distinctive background color different from adjacent areas, or being clearly delineated by a line, border, or margin. Signs, labels, and tags can have up to three (3) panels: signal word, message, and symbol. Signs, labels, and tags have either a message panel or a symbol/pictorial panel.

5.19 Radiation Signs/Tags. Signs and tags installed to identify areas where sources of radiation are or can be present.

5.20 Safety Alert Symbol. A symbol (exclamation mark) which indicates a potential personnel safety hazard. It is composed of an equilateral triangle surrounding an exclamation point. This symbol can be used with the signal word to alert personnel to potential hazards. Reference Appendix D.

5.21 Safety Instruction Signs. Signs installed where there is a need for general instructions and suggestions relative to safety measures (e.g., safety precautions, safe work practices or instructions for hazard avoidance, reduction, or elimination).

5.22 Sign. A surface prepared with imprinted text, symbols, and/or colors for the warning of, or safety instruction of, industrial workers or members of the public who may be exposed to hazards. Excluded from this definition, however, are news releases, displays commonly known as safety posters, and bulletins used for employee education.

5.23 Signal Word. The word or words of a sign, tag, placard, or label that calls attention to the safety sign, tag, placard, or label and designates a degree or level of hazard seriousness and the degree or level of attention to safety required of the employee (e.g., Caution, Danger, Notice, or Warning). Signal words are always imprinted in a distinctive panel located in the uppermost portion of a sign or tag.

5.24 Signals. Moving signs, provided by workers such as flagmen, or by devices such as flashing lights, to warn of possible or existing hazards.

5.25 Safety Color Code for Marking Physical Hazards. OSHA specifications are to use red and yellow to communicate the presence of physical hazards. At MSFC yellow is commonly used to warn employees of the presence of any physical hazard.

5.26 Symbol/Pictograph. The portion of a sign, tag, placard, or label bearing a graphic/picture used to identify a hazardous condition, or to convey a safety instruction or message without the use of words. The symbol/pictograph can be used to supplement the signal word and/or message to represent a hazard category, hazard avoidance action, consequence, or exposure to a hazard, or a combination of these.

5.27 Tag. A device used to identify a hazardous condition, usually made of card, paper, pasteboard, plastic, or other material. In the construction industry, a temporary sign, usually attached to a piece of equipment or part of a structure to warn of existing or immediate hazards.

5.28 Warning Signs/Tags. Signs and tags installed to call attention to potential hazards that, if not avoided, can result in serious injury or death. The potential hazard level is greater than that indicated by "Caution," but less than that indicated by "Danger."

6. INSTRUCTIONS

SIGNS, TAGS, AND BARRICADES ARE NOT CONSIDERED AS A COMPLETE WARNING METHOD, BUT SHALL BE USED TO HELP COMMUNICATE HAZARDOUS CONDITIONS. THE MARKING OF A PHYSICAL HAZARD BY A STANDARD COLOR WARNING SHOULD NEVER BE ACCEPTED AS A SUBSTITUTE FOR THE REDUCTION OR ELIMINATION OF THE HAZARD.

6.1 All employees shall be informed of the MSFC Hazard Identification and Warning System. This includes the meaning and use of the various signs, tags, and barricades used throughout MSFC.

6.2 All employees are authorized to identify potentially hazardous conditions that cannot be corrected on the spot and are temporary in nature. The identification can be accomplished by any method deemed appropriate for the hazard such as placing cones or erecting a temporary barricade to alert other employees of wet floors.

6.2.1 Potentially hazardous conditions that are considered more than temporary shall be evaluated per sections 6.3 and 6.4.

6.2.2 Reference MWI 8715.15 for more information in performing a safety assessment for a hazardous condition, operation, or area.

6.3 Hazard Identification Process

6.3.1 When a hazardous condition is identified and cannot be corrected on the spot by the employee, the supervisor(s) responsible for the work area, the building manager, or the Industrial Safety Department (ISD) shall be notified.

6.3.2 The work area supervisor, the building manager, or ISD shall visually examine and evaluate the potentially hazardous condition.

6.3.3 If the potentially hazardous condition cannot be corrected on the spot, the employees in the work area shall be notified of the potential hazard.

6.3.4 If appropriate, the area adjacent to the potential hazard shall be secured using a temporary barricade, or other appropriate methods to deter personnel access to the area until the hazard is corrected.

6.3.5 If the area is not required to be secured, the potential hazard shall be identified by posting or hanging the appropriate warning sign or tag to effectively communicate the hazard until it is corrected.

6.3.6 After the potentially hazardous condition has been corrected, all barricades, signs, and tags used to identify or draw attention to the potential hazard shall be removed.

6.4 Hazard Warning System

6.4.1 Any potentially hazardous condition that cannot be eliminated from the work area shall be identified by one of the methods described in this MWI.

6.4.1.1 Identifying or marking potential or physical hazards with signs, tags, placards, labels, barricades, or marking with a standard safety color shall not be considered an acceptable substitute for the elimination of the hazard.

6.4.2 Engineering and/or administrative controls, in combination with procedural training, shall be the first method implemented to eliminate or reduce the hazard.

6.4.3 Any hazard remaining after implementing 6.4.2 for an operation, process, or work area shall be identified or marked with the appropriate hazard warning signs, tags, placards, labels, or barricades in accordance with this MWI.

6.4.4 The signs, tags, placards, or labels shall be affixed as close as safely possible to the respective hazard by a positive means such as a string, wire, adhesive, or other means that prevents their loss or unintentional removal.

6.4.5 Barricades shall be erected a safe distance from the hazard as determined by the organization erecting the barricade.

6.5 Signs, Tags, Placards, and Labels

6.5.1 Safety signs, tags, placards, and labels can be purchased from the MSFC Retail Store, or constructed/computer generated at MSFC.

6.5.1.1 Signs, tags, placards, and labels constructed/computer generated at MSFC shall meet all the requirements of this MWI.

6.5.1.2 Signs, tags, placards, and labels shall clearly state any information or specific requirement so it is easily understood by all employees, such as “Safety Glasses required only while operating machinery” or “Safety Glasses required when outside designated walkway,” etc. Reference MWI 8715.4.

6.5.2 Due to the critical importance of consistency and uniformity in establishing and maintaining an effective hazard notification system, all new and all replacement signs, tags, placards, and labels shall meet the specifications and requirements in this MWI unless specified otherwise in another MSFC instruction or specification.

6.5.3 Signs, tags, placards and labels shall be replaced when they become faded and no longer meet the legibility requirements for safe viewing distances in section 6.7.2.3 and 6.7.3.3.

6.5.4 MSFC directorates and offices shall assure all employees and contractors under their direction comply with the MSFC hazard notification system defined in this MWI.

6.5.5 Signs, tags, placards, and labels shall be posted or hung to inform others in the area of potentially hazardous conditions, equipment, and operations.

6.6 Contact the MSFC Industrial Safety Department (ISD) and/or Environmental Engineering and Occupational Health Office (EEOHO) for assistance in evaluating potentially hazardous safety, health, and environmental conditions, if necessary.

6.7 MSFC Specifications for Hazard Notification Signs, Tags, Placards, Labels

6.7.1 Signs, tags, placards, and labels shall contain the appropriate information necessary to identify the potential hazard and be easily understood by all employees who can be exposed to the hazard.

6.7.2 General Sign Specifications

6.7.2.1 Signs shall contain accurate and specific information about the hazard and be easily understood by all employees that can be exposed to the hazard.

6.7.2.2 The sign shall consist of one of the following methods:

- A signal word and major message as shown in Appendix A, or
- A symbol/pictograph and major message or message as shown in Appendix B, or
- A combination of a symbol/pictograph, signal word, major message, and message as shown in Appendix C.

6.7.2.3 The sign shall be easily read at a minimum distance of 5 feet, or a greater distance as warranted by the nature of the hazard.

6.7.2.4 Signs can be made of metal, card stock, paperboard, plastic, or other imprinted material and shall be furnished with rounded or blunt corners free from sharp edges, burrs, splinters, or other sharp projections.

6.7.2.5 Signs shall be securely attached with fastening devices located in such a way not to create a hazard.

6.7.2.6 Signs shall be removed when the hazardous condition no longer exists.

6.7.3 General Tag Specifications

6.7.3.1 Tags shall contain accurate and specific information about the hazard and be easily understood by all employees that can be exposed to the hazard.

6.7.3.2 The tag shall consist of one of the following methods:
- A signal word and major message as shown in Appendix A, or
- A symbol/pictograph and major message or message as shown in Appendix B.

6.7.3.3 The tag signal word or pictograph be shall readable at a minimum distance of 5 feet or a greater distance as warranted by the nature of the hazard.

6.7.3.4 Tags can be made of card stock, paperboard, plastic, or other imprinted material.

6.7.3.5 Tags shall be attached by string or wire.

6.7.3.6 Tags shall be removed when the hazardous condition no longer exists.

6.7.4 General Placard and Label Specifications:

6.7.4.1 Placards and labels shall meet the requirements listed for signs or tags depending on the material they are made from and their application.

6.8 Danger Signs and Tags

6.8.1 Danger signs shall have the signal word “DANGER” in white letters on a red oval background with a white border within a black rectangular background located in the uppermost portion of the sign.

6.8.2 No other signal word or symbol/pictograph shall be used within the distinctive color and shape arrangement.

6.8.3 The symbol/pictograph panel, if used, shall be square having a black or red symbol on a white background, or a white symbol on a red background.

6.8.4 The major message and/or message shall be printed in black or red letters on a white background.

6.8.5 Danger sign colors of red, black, and white shall be those of opaque glossy samples as specified in ANSI Z535.1, Table 1, "Fundamental Specification of Safety Colors for CIE Illuminant C."

6.8.6 Danger tags shall have the signal word "DANGER" imprinted in white letters on a red oval background within a black rectangular background located near the top of the tag.

6.8.7 Danger signs and tags can vary slightly in design depending on the manufacturer.

6.8.8 Danger signs and tags shall only be used in situations to call attention to potential hazards that, if not avoided, can result in serious injuries or death. Reference 5.6 for the definition and when appropriate to use this sign/tag.

6.9 Caution Signs and Tags

6.9.1 Caution signs shall have the signal word "CAUTION" printed in yellow letters within a black rectangular background located in the uppermost portion of the sign.

6.9.2 This distinctive color and signal shape arrangement shall be reserved for caution signs only.

6.9.3 The symbol/pictograph panel, if used, shall be square with the black symbol/pictograph printed on a yellow background.

6.9.4 The major message and/or message shall be printed in black letters on a yellow background.

6.9.5 Caution sign colors shall be those of opaque glossy samples specified in ANSI Z535.1, Table 1, "Fundamental Specification of Safety Colors for CIE Illuminant C."

6.9.6 Caution tags shall have the signal word "CAUTION" printed in yellow letters within a black rectangular background located near the top of the tag.

6.9.7 Caution signs and tags can vary slightly in design depending on the manufacturer.

6.9.8 Caution signs and tags shall be used in minor hazard situations to call attention to potential hazards or unsafe practices which, if not avoided, could result in minor to moderate injuries or property damage.

6.9.10 Caution tags shall not be used when there is any potential for death or severe injury. Reference 5.5 for the definition and when appropriate to use this sign/tag.

6.10 Warning Signs and Tags

6.10.1 Warning signs shall have signal word “WARNING” printed in black letters on an orange truncated diamond within a black background located on the uppermost portion of the sign.

6.10.2 No other word or symbol/pictograph shall be used with this distinctive shape or color arrangement.

6.10.3 The symbol/pictograph panel, if used, shall be a square with a black symbol/pictograph on an orange background.

6.10.4 The major message and/or message panel shall contain an appropriate major message printed in black letters on a orange background.

6.10.5 Warning sign colors shall be those of opaque glossy samples specified in ANSI Z535.1, Table 1, “Fundamental Specification of Safety Colors for CIE Illuminant C.”

6.10.6 Warning tags shall have the signal word “WARNING” printed in black letters on an orange truncated diamond within a black rectangular background, or on an orange rectangular background delineated with a black border in the uppermost portion of the tag.

6.10.7 Warning signs and tags can vary slightly in design depending on the manufacturer.

6.10.8 Warning signs and tags shall be used in situations to call attention to potential hazards that, if not avoided, can result in serious injury or death. Reference 5.28 for the definition and when appropriate to use this sign/tag

6.11 Notice Signs and Tags

6.11.1 Notice Signs and tags shall have the signal word “NOTICE” printed in white letters on a blue rectangular background located in the uppermost portion of the sign or tag.

6.11.2 No other signal word or symbol/pictograph shall be used within this distinctive shape or color arrangement.

6.11.3 The symbol/pictograph panel, if used, shall be square with a blue or black symbol/pictograph on a white background, or white symbol on a blue background.

6.11.4 The major message or message shall be imprinted with blue or black letters on a white background.

6.11.5 Notice sign colors shall be those of opaque glossy samples specified in ANSI Z535.1, Table 1, “Fundamental Specification of Safety Colors for CIE Illuminant C.”

6.11.6 Notice signs and tags can vary slightly in design depending on the manufacturer.

6.11.7 Notice signs and tags shall be used to provide general information. Reference 5.17 for the definition and when appropriate to use this sign/tag.

6.12 Biohazard Signs and Tags

6.12.1 Biohazard signs and tags shall have a signal word "BIOHAZARD" located near the top of the sign or tag.

6.12.2 Use of the biological symbol/pictograph is optional, as long as there is sufficient contrast for the symbol to be clearly defined. The symbol/pictograph color shall be a fluorescent orange or orange-red.

6.12.3 There is no standard color for lettering or background; however there shall be sufficient contrast between the lettering and the sign or tag background to make the imprinted symbol or lettering legible.

6.12.4 The symbol/pictograph design for biological hazard signs and tags shall conform to the design specification of 29 CFR 1910.145 (f)(8)(ii).

6.12.5 Biohazard signs and tags can vary slightly in design depending on the manufacturer.

6.12.6 Biohazard signs and tags shall be used to identify the actual or potential presence of a biological hazard and also used to identify equipment containers, rooms, materials, experimental animals, or combination thereof, which contain, or are contaminated with, hazardous biological agents.

6.12.7 This shall also include infectious agents presenting a risk or potential risk to the well being of humans.

6.13 Radiation Signs and Tags

6.13.1 Radiation signs and tags shall have the signal word "RADIATION" printed in reddish purple (magenta) on a panel with yellow letters on a yellow background located in the uppermost portion of the sign or tag.

6.13.2 The symbol/pictograph panel shall have the standard reddish purple (magenta) three-bladed object with one blade pointed downward and centered on the vertical axis.

6.13.3 The standard symbol/pictograph shall be reddish purple (magenta) and on a yellow background.

6.13.4 The major message or message, if used, shall be imprinted with black letters on a yellow background.

6.13.5 Radiation signs and tags may vary slightly in design depending on the manufacturer.

6.13.6 Radiation signs and tags shall be used to identify the presence of a radiation hazard and to identify equipment, containers, rooms, or a combination thereof, that contain, or are contaminated with, hazardous radiation. Reference MPD 1860.2, "Radiation Safety Program."

6.14 Safety Instruction Signs

6.14.1 Safety instruction signs shall have a signal word conveying general safety messages printed in white letters on a green rectangular background located in the uppermost portion of the sign.

6.14.2 The signal words "DANGER," "CAUTION," "WARNING," and "NOTICE" shall not be used on these signs.

6.14.3 The symbol/pictograph panel, if used, shall be square with a green symbol/pictograph on a white background, or a black symbol/pictograph on a white background having a green border.

6.14.4 The major message or message shall be imprinted with green or black letters on a white background.

6.14.5 Safety instruction sign colors shall be those of opaque glossy samples specified in ANSI Z535.1, Table 1, "Fundamental Specification of Safety Colors for CIE Illuminant C."

6.14.6 Safety instruction signs shall be used where there is a need for general instructions and suggestions relative to safety measures.

6.14.7 Safety instruction signs shall not be installed where this instruction requires use of danger, warning, or caution signs. Reference 5.21 for the definition and when appropriate to use this sign/tag.

6.15 Slow Moving Vehicle (SMV) Emblems and Placards

6.15.1 The SMV emblem consists of a fluorescent yellow-orange triangle, with a dark red reflective border. The yellow-orange florescent triangle is a highly visible color for daylight exposure. The reflective border defines the shape of the fluorescent color in daylight, and creates a hollow red triangle in the path of motor vehicle headlights at night.

6.15.2 Neither the color film pattern and it's dimensions nor the backing shall be altered to permit use of advertising or other markings.

6.15.3 The SMV emblem shall be constructed of a rustproof and a waterproof material of sufficient thickness to assure a permanent flat surface and allow permanent adhesion of pressure-sensitive materials.

6.15.4 The SMV Emblem shall be mounted (pointing upward) 3 to 5 feet above the ground on the center rear of the vehicle or as near left center as possible.

6.15.5 The orange fluorescent pressure-sensitive material in the center of the SMV Emblem shall be replaced when it is no longer visible in normal sunlight for a distance of 500 feet.

6.15.6 The red reflective pressure-sensitive material on the border of the SMV Emblem shall be replaced when it is no longer visible at night from a distance of 500 feet when illuminated by the lower beam of motor vehicle headlights.

6.15.7 The SMV Emblem shall be used on all vehicles designed for speeds of less than 25 miles per hour. Reference MWI 6700.1, Appendix A for more information.

6.16 Laser Signs

6.16.1 Laser signs shall have one of two signal words, “CAUTION” with black letters on a yellow background, or “DANGER” with white letters in a red border on a white background.

6.16.1.1 Class 2 and Class 3a lasers shall have signal word “CAUTION.”

6.16.1.2 Class 3b and 4 lasers shall have the signal word “DANGER.”

6.16.1.3 Contact the Environmental Engineering and Occupational Health Office (EEOHO) for more information.

6.16.2 A safety alert symbol/pictograph can be placed left of the signal word located in the uppermost portion of the sign.

6.16.3 The symbol/pictograph shall be a red or yellow radiating sunburst (laser burst symbol) and line.

6.16.4 The major message or message, if used, shall contain warning statements imprinted with black letters depending on the four laser classes.

6.16.5 Laser sign colors shall be those of opaque glossy samples specified in ANSI Z535.1, Table 1, “Fundamental Specification of Safety Colors for CIE Illuminant C.”

6.16.6 Laser signs shall be used to identify the presence of a radiation hazard with the potential for causing biological damage. Reference MPD 1860.1, “Laser Safety.”

6.16.7 Laser signs can vary slightly in design depending on the manufacturer.

6.17 Other Signs and Tags

6.17.1 Fire safety signs do not have a standard signal word, and typically have a white symbol/pictograph on a red background, or a black image on a white background with a red border.

6.17.2 The symbol/pictograph panel, if used, shall be red on white, or white on red.

6.17.3 The major message or message, if used, shall be printed in red letters on a white square or rectangular background.

6.18 Lockout/Tagout tags

6.18.1 Shall consist of the colors white, red, and black.

6.18.2 Shall have a white background with red diagonal stripes.

6.18.3 Shall have the signal word “DANGER” in a red oval within a black border near the upper most portion of the tag.

6.18.4 Shall have the words “LOCKOUT/TAGOUT” printed on the red diagonal stripes.

6.18.5 Shall have the major message words “DO NOT OPERATE.”

6.18.6 Reference MWI 8715.2, “Lockout/Tagout Program,” for more information.

6.18.7 Lockout/Tagout tags can vary slightly in design depending on the manufacturer.

6.19 Piping Signs and Labels

6.19.1 Piping signs and labels are recommended for the identification of piping systems used in commercial and institutional installations, and in buildings used for public assembly. Piping systems are divided into three categories: high hazard materials, low hazard materials, and fire suppression materials.

6.19.2 High hazard material piping systems shall have signs or labels with black letters imprinted on a yellow background. Materials in these piping systems include corrosive and caustic materials, substances that are toxic or capable of creating toxic gases, explosive and flammable materials, radioactive substances, and materials that, if released, would be hazardous due to the extreme pressure or temperatures.

6.19.3 Low hazard material piping systems are divided into two different color schemes. Materials in these piping systems are not inherently hazardous and have a small chance of harming employees through mild temperatures and low pressures. Piping systems containing liquids or liquid mixtures shall have signs or labels with white letters imprinted on a green background.

6.19.4 Piping systems containing gases or gaseous mixtures shall have signs or labels with white letters imprinted on a blue background.

6.19.5 Fire suppression materials piping systems shall have signs or labels with white letters imprinted on a red background. Materials in these piping systems include fire protection materials such as foam, carbon dioxide, halon, and water.

6.19.6 Piping labels shall be positioned on the pipes so they can be easily read. The proper placement is on the lower side of the pipe if the employee has to look up to the pipe, on the upper side of the pipe if the employee has to look down towards the pipe, or directly facing the employee if on the same level as the pipe.

6.19.7 Piping Labels shall be located near valves, branches, where a change in direction occurs, on entry/re-entry points through walls or floors, and on straight segments with spacing between labels that allows for easy identification.

6.19.8 Piping sign and label colors shall be those of opaque glossy samples specified in ANSI Z535.1, Table 1, "Fundamental Specification of Safety Colors for CIE Illuminant C."

6.19.9 Reference ASME A13.1, "Scheme for Identification of Piping Systems," for additional information.

6.20 Chemicals and Hazardous Materials

6.20.1 Chemical and hazardous material containers shall be identified using the manufacturer's label, or HMIS, or NFPA 704, or other MSFC approved signs, labels, and tags in accordance with MPR 1840.3, "MSFC Hazard Communication Program."

6.20.2 All chemical containers (excluding small transfer containers for an employee's own immediate use) shall be labeled or tagged in accordance with 29 CFR 1910.1200.

6.20.3 As a minimum, the label shall identify the chemical as it appears on the Material Safety Data Sheet (MSDS) and contain the appropriate hazard warning.

6.20.4 Laboratory areas that have special or unusual hazards shall be posted with warning signs. These hazards can be radiation, x-ray, laser operations, flammable materials, biological hazards, or other special situations.

6.20.5 Explosive storage areas shall be posted with signs or placards with the signal word "Explosives" or the symbol/pictograph of an explosion burst in accordance with 29 CFR 1910.109 and NFPR 495.

6.20.6 Explosive containers and magazines used for transportation shall have a placard or label in accordance with 49 CFR 172.304.

6.20.7 Explosive signs, placards, and labels shall have letters and/or symbol/pictograph displayed on a background of a sharply contrasting color.

6.20.8 The major message or message, if used, shall be letters displayed on a background of sharply contrasting color and contain wording similar to “Keep Off” or “Keep Out,” etc., or can be the explosive number classification.

6.21 Barricades

6.21.1 Barricades shall be erected to identify/designate potentially hazardous areas where safety depends on restricting access to the area, operation, or process to authorized personnel only.

6.21.2 Temporary physical barricades shall be constructed of substantial material capable of impeding entry or denying access to an area. These barricades can be constructed of a wooden structure, orange polyethylene fencing with a grid or diamond mesh structure, concrete barriers, etc. Barricade tape and traffic cones are not categorized as physical barricades due to the ease with which they may be bypassed.

6.21.3 A barricade shall not be categorized as permanent unless constructed of extremely durable material (e.g., metal, concrete, or wood) and installed in a manner that effectively prevents removal by unauthorized personnel.

6.21.4 If authorized personnel are to be permitted to cross the barricades, a sign or tag shall be posted on or near to the barricade bearing the message “Authorized Personnel Only.”

6.21.5 Barricades can be installed by any employee or organization at MSFC to alert personnel of a restricted area.

6.21.6 The MSFC Protective Services Department shall be responsible for installing barricades at accident scenes, and for controlling site access (authorized personnel only).

6.21.7 Temporary barricades shall be maintained by the organization that erected them. This includes periodic verification that the barricade installation continues to effectively deter unauthorized employee access to the hazard.

6.21.8 The use of barricade tape is considered a temporary barricade and is one method used to block or restrict access to hazardous areas. This tape can also be used by Security and other organizations to restrict access to mishap scenes for purposes of preserving evidence. This tape can be used as a temporary barricade until a physical or permanent barricade is erected.

6.21.9 Barricade tape can be used to block or restrict access to hazardous areas for a maximum period of 5 consecutive workdays. If a barricade is required for a longer time period, a more physical barricade shall be erected.

6.21.10 Barricade tape imprinted with hazard identification (e.g., asbestos or biohazard) shall only be used to deter access to areas characterized by the specified hazard category.

6.21.11 The organization that erected a temporary or permanent barricade shall be responsible for removing the barricade when the hazard has been corrected, operation has been completed, or a permanent access control has been installed or implemented.

6.21.12 Temporary barricades erected during lifting operations shall be located away from the lifting operation in accordance with Appendix C, "Guideline for Falling Object Safety Zone."

6.22 Color Code for Marking Physical Hazards

6.22.1 Red shall be the basic color for the identification of danger, fire protection equipment and apparatus, emergency stop bars, and stop buttons used for emergency stopping of machinery.

6.22.1.1 Safety cans or other portable containers of flammable liquids having a flash point at or below 80 degrees Fahrenheit, excluding shipping containers, shall be painted red with some additional clearly visible identification either in the form of a yellow band around the can, or the name of the contents conspicuously stenciled or painted on the can in yellow.

6.22.2 Yellow shall be the basic color for designating caution. Alternating yellow and black stripes or squares can be used for maximum contrast with a specific background.

6.22.2.1 Yellow shall be used for marking physical hazards such as striking against, stumbling, falling, tripping, caught between, flammable material storage cabinets, and containers for corrosive or unstable materials.

6.22.2.2 Such containers shall be yellow, or identified by a yellow band around their middle, and placed at least one-quarter of the container's height.

6.22.2.3 The container shall be labeled to identify its contents.

6.22.3 Orange shall be the basic color for designating warning and for representing a level of hazard less than that requiring the danger signal, but more than that requiring the caution signal.

6.22.3.1 Orange shall be used for marking machinery hazards such as parts having the potential to cut, crush, or otherwise injure personnel, machinery hazards such as open or removed enclosure doors and/or guards where personnel could be exposed to unguarded hazards, and moveable parts having the potential to injure personnel such as movable guards, pulleys, gears, rollers, cutting devices, and power jaws.

6.22.3.2 Marking the edges of such parts can assist in drawing employee attention to the most hazardous system component.

6.22.4 Green shall be the basic color for designating safety instructions and information.

6.22.4.1 Green shall be used for marking items such as storage location of protective and other safety equipment, safety bulletin boards, and safety information signs.

6.22.5 Blue shall be the basic color for designating employee notices.

6.22.5.1 Blue shall be used for identifying parking areas for physically challenged persons, handicap accessible facilities, and loading dock instructions.

6.22.6 Black and white combinations shall be the basic colors for designating traffic and facility information such as traffic markings, housekeeping markings, floor load limits, etc.

6.23 Low Oxygen Alarms

6.23.1 Low oxygen atmosphere signs shall have a signal word and message instructing employees what actions to take in the event of an alarm.

6.23.2 Contact EEOHO if an assessment is needed in areas where a low oxygen atmosphere can exist.

6.24 Roadway and Parking lot signs

6.24.1 Signs installed on MSFC controlled roadways and parking lots shall comply with 23 CFR 655, "Traffic Operations" Manual on Uniform Traffic Control Devices (MUTCD) and/or the Alabama Department of Transportation requirements.

6.25 Test Area Warning Signs and Lights

6.25.1 Warning signs and lights used in the Test Area to control access to hazardous areas and test operations shall comply with this MWI and/or Test Area Instructions.

7. NOTES

7.1 Instructions for the use of lockout/tagout are found in MWI 8715.2, "Lockout/Tagout Program."

7.2 Examples of the various signs and tags found at MSFC are shown in Appendix A.

7.3 Examples of the various pictographs found at MSFC are shown in Appendix B.

7.4 Example of a sign containing a symbol/pictograph, signal word, and major message is shown in Appendix C.

7.5 Example of the safety alert symbol and it's use with "Danger," "Caution," and "Warning" signs is shown in Appendix D.

8. SAFETY PRECAUTIONS AND WARNING NOTES

Observe and follow all sign and tag warnings.

9. RECORDS

The record for training is the attendance sheet for the monthly safety meeting with the topic "Hazard Identification and Warning System." This attendance sheet shall be maintained by the supervisor in the Supervisors Safety Web Page (SSWP) database in accordance with NRRS 3/33/G/2 [3400] for the length of employment then destroyed when no longer needed.

10. PERSONNEL TRAINING AND CERTIFICATION

10.1 Employees shall be provided with training in accordance with the requirements of 29 CFR 1910.145, "Specifications for Accident Prevention Signs and Tags."

10.2 This training describes the alerting methods (signs, tags, barricades, color codes, etc.) used to warn employees of the potential for personnel injury and hazards inherent in the work environment and facilities at MSFC.

10.3 This training is provided by the Safety and Mission Assurance (S&MA) Directorate every 2 years to the supervisors via the Supervisors Safety Web Page (SSWP) and given to all employees during a monthly safety meeting.

11. FLOW DIAGRAM

None

12. CANCELLATION

MWI 8715.3C dated September 10, 2004

Original signed by
Robin N. Henderson for

David A. King
Director

APPENDIX A

Example Danger Sign and Tag

Example Warning Sign and Tag

Example Caution Sign and Tag

Example Notice Sign and Tag

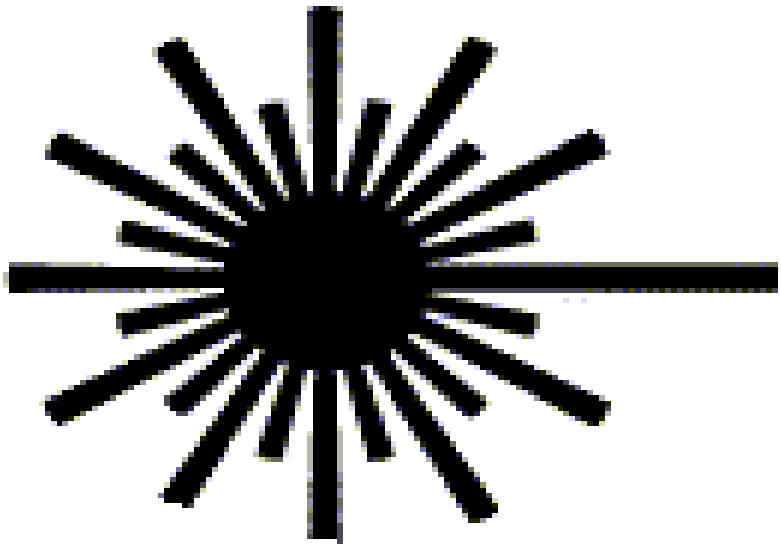
NOTICE

AUTHORIZED PERSONNEL ONLY

Example Safety Instruction Sign

Example Radiation Hazard Sign

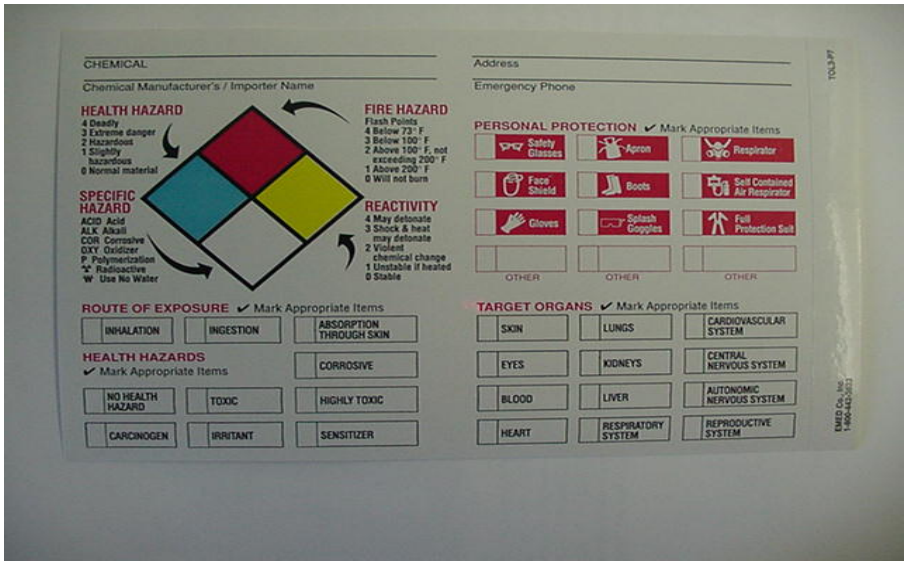
Example Laser Symbol



Example Biohazard Symbol

Example Lockout/Tagout Tag

Example Hazardous Material Identification System (HMIS) Label



Example National Fire Protection Association (NFPA) 704 Label

APPENDIX B

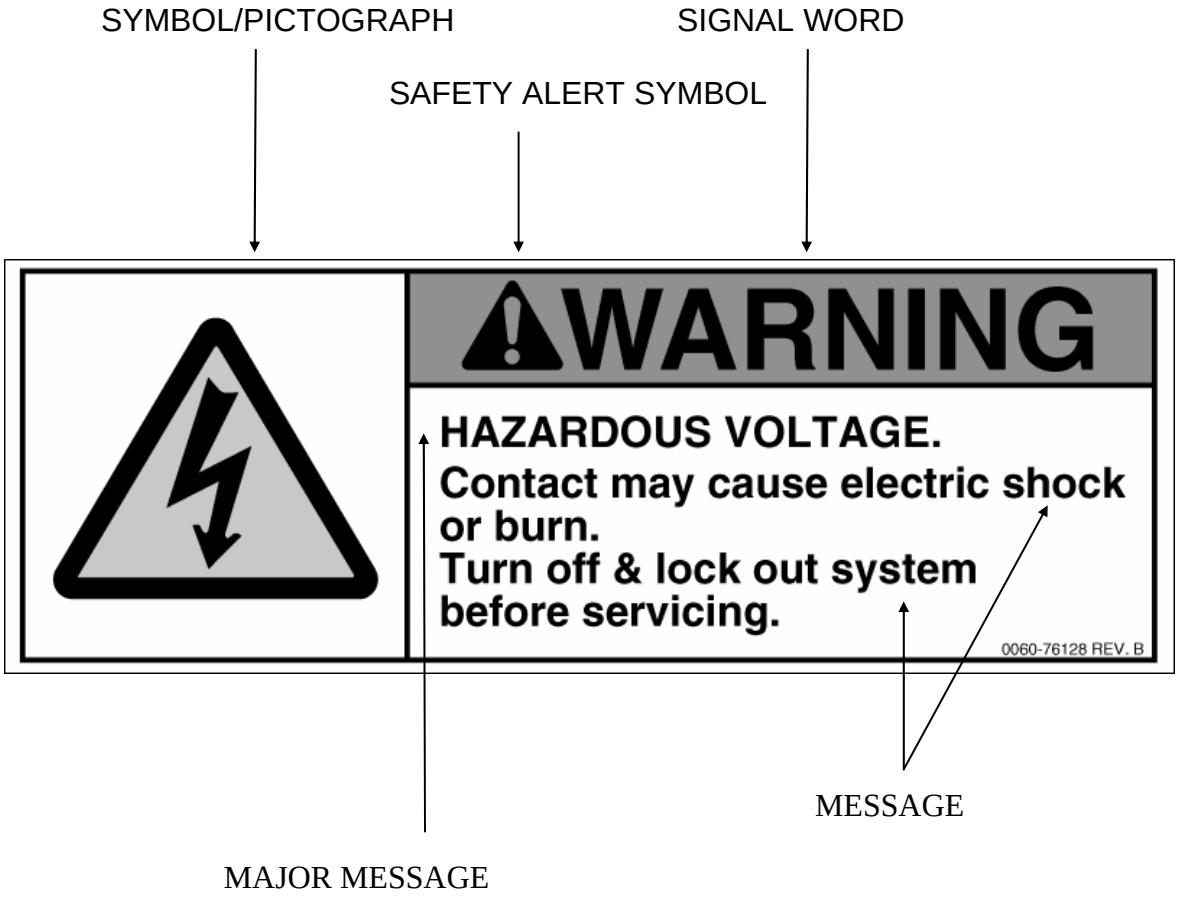
CHECK THE MASTER LIST at https://repository.msfc.nasa.gov/directives/directives.htm
VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

Examples of Symbol/Pictograph with a Major Message or Message

APPENDIX C

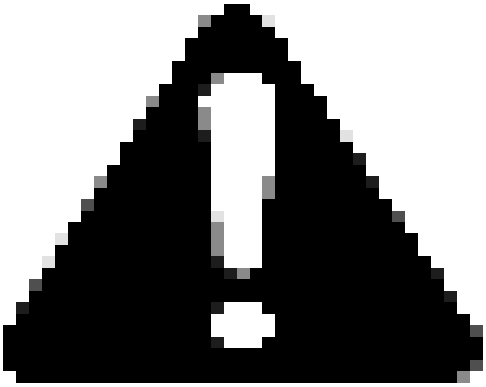
Combination
Symbol/Pictograph, Safety Alert Symbol, Signal Word, Major Message, or Message

NOTE: The safety alert symbol is not always contained with the signal word and a message is not always contained with the major message.



APPENDIX D

Example Safety Alert Symbol



Examples of the Safety Alert Symbol Used with Danger, Warning, and Caution

APPENDIX E

GUIDELINE FOR FALLING OBJECT SAFETY ZONE
(FLOOR & OFFICE SPACE

FALLING OBJECT SAFETY ZONE = POTENTIAL FALL HEIGHT / 3